#9

ENTERED OIPE

RAW SEQUENCE LISTING DATE: 04/24/2002 p.6
PATENT APPLICATION: US/09/784,554B TIME: 15:50:31

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

```
      3 <110> APPLICANT: Schnorr, Kirk
      4       Jorgensen, Per Lina
      5       Schulein, Martin
      7 <120> TITLE OF INVENTION: FAMILY 44 XYLOGLUCANASES
      9 <130> FILE REFERENCE: 10017.200-US
C--> 11 <140> CURRENT APPLICATION NUMBER: US/09/784,554B
C--> 11 <141> CURRENT FILING DATE: 2001-02-16
     11 <160> NUMBER OF SEQ ID NOS: 16
     13 <170> SOFTWARE: PatentIn version 3.1
     15 <210> SEQ ID NO: 1
     16 <211> LENGTH: 4059
     17 <212> TYPE: DNA
     18 <213> ORGANISM: Paenibacillus polymyxa
     20 <400> SEQUENCE: 1
     21 atgagggcga aaaatagtag taatcttttg ttcaaacgtt ccaaatggct gcctgtcgtc     60
     23 atggcctgca cgatgatagt agggggggct ttacctgctc cagctgtggt tcacggtcaa    120
     25 acggcaaaga ctattactat taaagtagat acattcaagg atcgtaagcc tattagccct    180
     27 tatatatacg gtacaaatca ggatttggca ggcgatgaaa atatggctgc cagacgactt    240
     29 ggtggcaacc gaatgaccgg atacaactgg gaaaacaata tgtccaatgc aggaagtgac    300
     31 tggcagcaat ctagcgataa ctatttatgc agtaatggtg gcctgacaca agccgaatgt    360
     33 gaaaagccag gagcggtgac gacttcgttt catgaccaat cgctgaagct tggcacttat    420
     35 tctttagtta cgttgccgat ggccggttat gtggctaagg atggaaacgg aagtgtgcag    480
     37 gaaagcgaaa aggccccttc cgctcgttgg aatcaggtcg taaacgccaa aaatgcaccg    540
     39 ttccaactac agcctgatct gaatgacaat cgggtctatg tggatgagtt cgtccatttt    600
     41 ttagtgaaca agtacggcac tgcttcaaca aaggcggggg tgaaaggata tgccctcgac    660
     43 aatgaacccg ctctctggtc gcatacgcac ccacgcattc atggtgaaaa agtcggagcg    720
     45 aaagagttgg tagaccggtc agtcagttta tccaaagctg tgaaagcgat tgacgcgggg    780
     47 gcagaggttt ttggcccggt tctttacgga tttggcgcct ataaagatct tcaaactgca    840
     49 cctgattggg actctgtaaa aggcaattat agctggttcg tagactatta cctggatcaa    900
     51 atgcgcctta gctcgcaagt cgaaggcaag agattgctgg atgtattcga cgtacactgg    960
     53 tatcccgaag cgatgggcgg aggcatacga attacgaatg aggtaggcaa tgacgaaacg   1020
     55 aagaaagcca gaatgcaggc acctcgcacc ttgtgggacc cgacctataa ggaagatagt   1080
     57 tggatcgctc aatggaacag cgagtttttg cccatactac ctcgattgaa gcagtcggtg   1140
     59 gataaatatt atccgggaac caagctggca atgaccgagt atagctatgg cggcgaaaat   1200
     61 gatatttccg gcgggattgc gatgaccgat gtgctgggta tcttgggcaa aaatgatgtt   1260
     63 tatatggcaa actactggaa gctaaaggat ggtgtcaaca actacgttag tgccgcttac   1320
     65 aagctttatc gcaattatga cggaaaaaac tctactttcg gtgataccag tgttagtgcg   1380
     67 caaacatcgg atattgtcaa tagctcggtc catgcttctg taacgaatgc atccgacaaa   1440
     69 gaactgcatc tcgttgtcat gaataaaagc atggacagcg cattcgacgc ccaatttgat   1500
     71 ctttccggcg cgaagactta catttccggt aaagtatggg ggttcgataa aaacagctcg   1560
     73 caaattaaag aagcagcgcc aatcacgcaa atttcaggca accgttttac ttataccgta   1620
     75 ccgcctttga cggcatatca cattgtgctg actactggca atgacacgtc tccagtggaa   1680
     77 ggtcctgaaa gctttaagct gaaagctgag gctggtgatg ggaaagtcca tttatcctgg   1740
```

RAW SEQUENCE LISTING DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:31

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

```
79 gatgcttcca gcggagttgt aggatacagc gtacagcggg caacagatga aaacggccct   1800
81 ttcactgctg tagcatccaa cttgaccgaa acgtcttata cggatactaa cgtgacaaac   1860
83 ggtacttcat actattacaa agtaaccgcc aaaaccaata agggatcgag cgaatccaat   1920
85 attttgaaag cggttccgaa gatgcctgta aacggtcccg ctcgctatga agccgaagaa   1980
87 ggcacgctga agggaaccat tgtggaatcc agcgggaccg gctactccgg tgctggttat   2040
89 gtaacgaatt tccacaatcc aggggattct ctgacgatga cgattcaggc tcccacggca   2100
91 ggcttgtaca atcttacaat cggctaccgt tctcctcatg atgacaaacg caccaatttc   2160
93 tcattaaacg gcaaagcgtt tggcgaactg ctgcttaaga aaacggctga ttttaaagaa   2220
95 acttccggag gcaaggtgct gttgaatgca ggcgcgaata cgatcagttt tgaaacaggc   2280
97 tggggctggt acgatatcga ctacgtcaga ctggagcctg ccgctgaccg cccacctcat   2340
99 gcggtaacca aaacgcttac caatccgaat gcgacggtag aagcaaaagc attgatgaac   2400
101 tatctggttg atcaatacgg gaagaatatg ctctctggtc aagaggaaat aaacgaaatt   2460
103 gattggcttc aagccaatgt aggtaaaaag ccggcgattg cagcgcttga cctgatcgac   2520
105 tattcgccaa gcagagcgga acacggtctt agttccacag aggcagaaaa ggcgattgca   2580
107 tgggataagc aaggggggat cgttaccttt gcatggcact ggaacgcacc gaaaggtctg   2640
109 atcgatacgc agggaaaaga atggtggaga ggcttctatg ccgattcaac cacattcgat   2700
111 atagaatatg cgatgaatca tccagagtcc gaagattata aattacttat tcgcgacatc   2760
113 gatgtgattg cagggcaatt gaagaagttg caggatgcga aggttcctgt cctgttccgt   2820
115 cctttgcacg aagcggaagg aaaatggttc tggtggggcg ccaaaggtcc tgagcctgtt   2880
117 aaaaagctgt atattttaat gcacgaccgt ttgacgaatg tgcacaaatt gaacaatctg   2940
119 atttgggtat ggaattctgt tgctccggat tggtatccgg gagacgagta tgtggatatt   3000
121 ttgagctttg actcttatcc gcaagcaggt gattacagcc cgcaaatttc aaaatacgaa   3060
123 gaccttgttg cattgggcaa ggacaaaaag ctagttgcca tgagcgaaaa tggaccgatc   3120
125 ccggaccctg atttgatgaa ggcgtatcaa gctcattgga gctggttcgc tacatggtat   3180
127 ggagattttg tgagagacgg caaacaaaac agccttgagc atctgaaaaa agtgtataat   3240
129 catccgaacg tcattacgct ggatgagctc ccaacgaact taaaaacgta tggcattact   3300
131 gagcagccgt ccgtaccggg cagcttcacg ctgaacgctg cgggtgaaac ggcgaaagta   3360
133 tcgctaagct ggacagcatc ggcgaatgcg aaaagctatg aagtgaagcg ttcgacgact   3420
135 gaaaacggcg cgttcgccac tgtagcgagt gatgtatatg gcagtagcta caccgacaca   3480
137 gctgtaacgg cagatacgac gtactactac caagtcgtag cgaagaacga tgcaggacag   3540
139 acgctgtcga acacggctag cgcaatgccg aaagcggata ctcagcagcc gacgacagga   3600
141 ctgctgctcc aatatcgcac agcagatact aaggtgaacg ataatcacct caatccgcaa   3660
143 ttccaaattg taaacaaagg cacaacctcc ataccgatca acgagttgaa aattcgctac   3720
145 tactacacaa tcgacggtga ccgtgagcag actttcaact gcgactatgc gacgctgagc   3780
147 tgctcaaagc tgaacggtaa actggttaaa atggagaagg ctgcaaccgg tgccgattat   3840
149 tatttggaag tcagtttcaa ttcggatgca ggcgtgttag cacctggagg aagcacgggc   3900
151 gatatccaaa cccgtattca taagacagac tggtcgaact ataacgaaag tgacgattat   3960
153 tcgtataaag gcacgcaaac ctcatttgcc gatcatccta aagttacctt gtatcataac   4020
155 ggcgtacttg tttggggaac cgagccgaca gctaattaa                          4059
158 <210> SEQ ID NO: 2
159 <211> LENGTH: 1352
160 <212> TYPE: PRT
161 <213> ORGANISM: Paenibacillus polymyxa
163 <400> SEQUENCE: 2
165 Met Arg Ala Lys Asn Ser Ser Asn Leu Leu Phe Lys Arg Ser Lys Trp
166 1               5                  10                  15
169 Leu Pro Val Val Met Ala Cys Thr Met Ile Val Gly Gly Ala Leu Pro
170             20                  25                  30
173 Ala Pro Ala Val Val His Gly Gln Thr Ala Lys Thr Ile Thr Ile Lys
```

RAW SEQUENCE LISTING DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:31

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

```
174          35                  40                  45
177 Val Asp Thr Phe Lys Asp Arg Lys Pro Ile Ser Pro Tyr Ile Tyr Gly
178      50                  55                  60
181 Thr Asn Gln Asp Leu Ala Gly Asp Glu Asn Met Ala Ala Arg Arg Leu
182 65                   70                  75                  80
185 Gly Gly Asn Arg Met Thr Gly Tyr Asn Trp Glu Asn Asn Met Ser Asn
186                  85                  90                  95
189 Ala Gly Ser Asp Trp Gln Gln Ser Ser Asp Asn Tyr Leu Cys Ser Asn
190              100                 105                 110
193 Gly Gly Leu Thr Gln Ala Glu Cys Glu Lys Pro Gly Ala Val Thr Thr
194          115                 120                 125
197 Ser Phe His Asp Gln Ser Leu Lys Leu Gly Thr Tyr Ser Leu Val Thr
198      130                 135                 140
201 Leu Pro Met Ala Gly Tyr Val Ala Lys Asp Gly Asn Gly Ser Val Gln
202 145                  150                 155                 160
205 Glu Ser Glu Lys Ala Pro Ser Ala Arg Trp Asn Gln Val Val Asn Ala
206                  165                 170                 175
209 Lys Asn Ala Pro Phe Gln Leu Gln Pro Asp Leu Asn Asp Asn Arg Val
210              180                 185                 190
213 Tyr Val Asp Glu Phe Val His Phe Leu Val Asn Lys Tyr Gly Thr Ala
214          195                 200                 205
217 Ser Thr Lys Ala Gly Val Lys Gly Tyr Ala Leu Asp Asn Glu Pro Ala
218      210                 215                 220
221 Leu Trp Ser His Thr His Pro Arg Ile His Gly Glu Lys Val Gly Ala
222 225                  230                 235                 240
225 Lys Glu Leu Val Asp Arg Ser Val Ser Leu Ser Lys Ala Val Lys Ala
226                  245                 250                 255
229 Ile Asp Ala Gly Ala Glu Val Phe Gly Pro Val Leu Tyr Gly Phe Gly
230              260                 265                 270
233 Ala Tyr Lys Asp Leu Gln Thr Ala Pro Asp Trp Asp Ser Val Lys Gly
234          275                 280                 285
237 Asn Tyr Ser Trp Phe Val Asp Tyr Tyr Leu Asp Gln Met Arg Leu Ser
238      290                 295                 300
241 Ser Gln Val Glu Gly Lys Arg Leu Leu Asp Val Phe Asp Val His Trp
242 305                  310                 315                 320
245 Tyr Pro Glu Ala Met Gly Gly Gly Ile Arg Ile Thr Asn Glu Val Gly
246                  325                 330                 335
249 Asn Asp Glu Thr Lys Lys Ala Arg Met Gln Ala Pro Arg Thr Leu Trp
250              340                 345                 350
253 Asp Pro Thr Tyr Lys Glu Asp Ser Trp Ile Ala Gln Trp Asn Ser Glu
254          355                 360                 365
257 Phe Leu Pro Ile Leu Pro Arg Leu Lys Gln Ser Val Asp Lys Tyr Tyr
258      370                 375                 380
261 Pro Gly Thr Lys Leu Ala Met Thr Glu Tyr Ser Tyr Gly Gly Glu Asn
262 385                  390                 395                 400
265 Asp Ile Ser Gly Gly Ile Ala Met Thr Asp Val Leu Gly Ile Leu Gly
266                  405                 410                 415
269 Lys Asn Asp Val Tyr Met Ala Asn Tyr Trp Lys Leu Lys Asp Gly Val
270              420                 425                 430
```

RAW SEQUENCE LISTING DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:31

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

```
273 Asn Asn Tyr Val Ser Ala Ala Tyr Lys Leu Tyr Arg Asn Tyr Asp Gly
274         435                 440                 445
277 Lys Asn Ser Thr Phe Gly Asp Thr Ser Val Ser Ala Gln Thr Ser Asp
278     450                 455                 460
281 Ile Val Asn Ser Ser Val His Ala Ser Val Thr Asn Ala Ser Asp Lys
282 465                 470                 475                 480
285 Glu Leu His Leu Val Val Met Asn Lys Ser Met Asp Ser Ala Phe Asp
286                 485                 490                 495
289 Ala Gln Phe Asp Leu Ser Gly Ala Lys Thr Tyr Ile Ser Gly Lys Val
290             500                 505                 510
293 Trp Gly Phe Asp Lys Asn Ser Ser Gln Ile Lys Glu Ala Ala Pro Ile
294         515                 520                 525
297 Thr Gln Ile Ser Gly Asn Arg Phe Thr Tyr Thr Val Pro Pro Leu Thr
298     530                 535                 540
301 Ala Tyr His Ile Val Leu Thr Thr Gly Asn Asp Thr Ser Pro Val Glu
302 545                 550                 555                 560
305 Gly Pro Glu Ser Phe Lys Leu Lys Ala Glu Ala Gly Asp Gly Lys Val
306                 565                 570                 575
309 His Leu Ser Trp Asp Ala Ser Ser Gly Val Val Gly Tyr Ser Val Gln
310             580                 585                 590
313 Arg Ala Thr Asp Glu Asn Gly Pro Phe Thr Ala Val Ala Ser Asn Leu
314         595                 600                 605
317 Thr Glu Thr Ser Tyr Thr Asp Thr Asn Val Thr Asn Gly Thr Ser Tyr
318     610                 615                 620
321 Tyr Tyr Lys Val Thr Ala Lys Thr Asn Lys Gly Ser Ser Glu Ser Asn
322 625                 630                 635                 640
325 Ile Leu Lys Ala Val Pro Lys Met Pro Val Asn Gly Pro Ala Arg Tyr
326                 645                 650                 655
329 Glu Ala Glu Glu Gly Thr Leu Lys Gly Thr Ile Val Glu Ser Ser Gly
330             660                 665                 670
333 Thr Gly Tyr Ser Gly Ala Gly Tyr Val Thr Asn Phe His Asn Pro Gly
334         675                 680                 685
337 Asp Ser Leu Thr Met Thr Ile Gln Ala Pro Thr Ala Gly Leu Tyr Asn
338     690                 695                 700
341 Leu Thr Ile Gly Tyr Arg Ser Pro His Asp Asp Lys Arg Thr Asn Phe
342 705                 710                 715                 720
345 Ser Leu Asn Gly Lys Ala Phe Gly Glu Leu Leu Leu Lys Lys Thr Ala
346                 725                 730                 735
349 Asp Phe Lys Glu Thr Ser Gly Gly Lys Val Leu Leu Asn Ala Gly Ala
350             740                 745                 750
353 Asn Thr Ile Ser Phe Glu Thr Gly Trp Gly Trp Tyr Asp Ile Asp Tyr
354         755                 760                 765
357 Val Arg Leu Glu Pro Ala Ala Asp Arg Pro Pro His Ala Val Thr Lys
358     770                 775                 780
361 Thr Leu Thr Asn Pro Asn Ala Thr Val Glu Ala Lys Ala Leu Met Asn
362 785                 790                 795                 800
365 Tyr Leu Val Asp Gln Tyr Gly Lys Asn Met Leu Ser Gly Gln Glu Glu
366                 805                 810                 815
369 Ile Asn Glu Ile Asp Trp Leu Gln Ala Asn Val Gly Lys Lys Pro Ala
```

RAW SEQUENCE LISTING DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:31

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

```
370              820                 825                 830
373 Ile Ala Ala Leu Asp Leu Ile Asp Tyr Ser Pro Ser Arg Ala Glu His
374         835                 840                 845
377 Gly Leu Ser Ser Thr Glu Ala Glu Lys Ala Ile Ala Trp Asp Lys Gln
378     850                 855                 860
381 Gly Gly Ile Val Thr Phe Ala Trp His Trp Asn Ala Pro Lys Gly Leu
382 865                 870                 875                 880
385 Ile Asp Thr Gln Gly Lys Glu Trp Trp Arg Gly Phe Tyr Ala Asp Ser
386                 885                 890                 895
389 Thr Thr Phe Asp Ile Glu Tyr Ala Met Asn His Pro Glu Ser Glu Asp
390             900                 905                 910
393 Tyr Lys Leu Leu Ile Arg Asp Ile Asp Val Ile Ala Gly Gln Leu Lys
394         915                 920                 925
397 Lys Leu Gln Asp Ala Lys Val Pro Val Leu Phe Arg Pro Leu His Glu
398     930                 935                 940
401 Ala Glu Gly Lys Trp Phe Trp Trp Gly Ala Lys Gly Pro Glu Pro Val
402 945                 950                 955                 960
405 Lys Lys Leu Tyr Ile Leu Met His Asp Arg Leu Thr Asn Val His Lys
406                 965                 970                 975
409 Leu Asn Asn Leu Ile Trp Val Trp Asn Ser Val Ala Pro Asp Trp Tyr
410             980                 985                 990
413 Pro Gly Asp Glu Tyr Val Asp Ile  Leu Ser Phe Asp Ser  Tyr Pro Gln
414         995                 1000                1005
417 Ala Gly  Asp Tyr Ser Pro Gln  Ile Ser Lys Tyr Glu  Asp Leu Val
418     1010                1015                1020
421 Ala Leu  Gly Lys Asp Lys Lys  Leu Val Ala Met Ser  Glu Asn Gly
422     1025                1030                1035
425 Pro Ile  Pro Asp Pro Asp Leu  Met Lys Ala Tyr Gln  Ala His Trp
426     1040                1045                1050
429 Ser Trp  Phe Ala Thr Trp Tyr  Gly Asp Phe Val Arg  Asp Gly Lys
430     1055                1060                1065
433 Gln Asn  Ser Leu Glu His Leu  Lys Lys Val Tyr Asn  His Pro Asn
434     1070                1075                1080
437 Val Ile  Thr Leu Asp Glu Leu  Pro Thr Asn Leu Lys  Thr Tyr Gly
438     1085                1090                1095
441 Ile Thr  Glu Gln Pro Ser Val  Pro Gly Ser Phe Thr  Leu Asn Ala
442     1100                1105                1110
445 Ala Gly  Glu Thr Ala Lys Val  Ser Leu Ser Trp Thr  Ala Ser Ala
446     1115                1120                1125
449 Asn Ala  Lys Ser Tyr Glu Val  Lys Arg Ser Thr Thr  Glu Asn Gly
450     1130                1135                1140
453 Ala Phe  Ala Thr Val Ala Ser  Asp Val Tyr Gly Ser  Ser Tyr Thr
454     1145                1150                1155
457 Asp Thr  Ala Val Thr Ala Asp  Thr Thr Tyr Tyr Tyr  Gln Val Val
458     1160                1165                1170
461 Ala Lys  Asn Asp Ala Gly Gln  Thr Leu Ser Asn Thr  Ala Ser Ala
462     1175                1180                1185
465 Met Pro  Lys Ala Asp Thr Gln  Gln Pro Thr Thr Gly  Leu Leu Leu
466     1190                1195                1200
```

RAW SEQUENCE LISTING ERROR SUMMARY DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:32

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

Please Note:
Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Seq#:5; N Pos. 715,716,717,718,719,720,721,722,723,724,725,726,727,728,729
Seq#:5; N Pos. 730,731,732,733,734,735,736,737,738,739,740,741,742,743,744
Seq#:5; N Pos. 745,746,747,748,749,750,751,752,753,754,755,756,757,758,759
Seq#:5; N Pos. 760,761,762,763,764,765,766,767,768,769,770,771,772,773,774
Seq#:5; N Pos. 775,776,777,778,779,780,781,782,783,784,785,786,787,788,789
Seq#:5; N Pos. 790,791,792,793,794,795,796,797,798,799,800,801,802,803,804
Seq#:5; N Pos. 805,806,807,808,809,810,811,812,813,814,815,816,817,818,819
Seq#:5; N Pos. 820,821,822,835
Seq#:6; Xaa Pos. 239,240,241,242,243,244,245,246,247,248,249,250,251,252
Seq#:6; Xaa Pos. 253,254,255,256,257,258,259,260,261,262,263,264,265,266
Seq#:6; Xaa Pos. 267,268,269,270,271,272,273,274,279

VERIFICATION SUMMARY DATE: 04/24/2002
PATENT APPLICATION: US/09/784,554B TIME: 15:50:32

Input Set : A:\seq.ST25.txt
Output Set: N:\CRF3\04242002\I784554B.raw

L:11 M:270 C: Current Application Number differs, Replaced Current Application No
L:11 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:1037 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:660
L:1039 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:720
L:1041 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:5 after pos.:780
L:1157 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:224
L:1161 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:240
L:1165 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:256
L:1169 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:6 after pos.:272